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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,952	04/25/2007	Edwin Nun	294009US0PCT	9750

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
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MATZEK, MATTHEW D

ART UNIT	PAPER NUMBER
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1786

NOTIFICATION DATE	DELIVERY MODE
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11/24/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/588,952	<b>Applicant(s)</b> NUN ET AL.	
	<b>Examiner</b> MATTHEW D. MATZEK	<b>Art Unit</b> 1786	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 September 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3,6-10 and 13-26 is/are pending in the application.
- 4a) Of the above claim(s) 13-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-10,13-15,26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/10</u> . | 6) <input type="checkbox"/> Other: _____  |

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***Response to Amendment***

1. The amendment dated 9/1/2010 has been fully considered and entered into the Record. Claims 4, 5, 11, and 12 have been cancelled. Claims 1, 13, 17, and 19 have been amended and new claim 26 has been added. Claims 1-3, 6-10, and 13-26 are currently pending with claims 16-25 withdrawn from prosecution. Claims 1-3, 6-10, 13-15, and 26 are active. The new and amended claims contain no new matter. The previous art rejections have been withdrawn due to the amendment of claim 1 to recite specific groups that are contained in the organic component. Examiner has withdrawn his previous objection, and previous 112 2<sup>nd</sup> paragraph rejections due to amendment.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-3, 6-10, 13-15, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Penth et al. (US 6,309,545 B1) in view of Armbrust et al. (WO 01/16241). Examiner has relied upon the English language equivalent of the WO document (US 6,828,381 B1) for examination purposes.

a. Penth et al. disclose a composite material comprising a support layer and a ceramic material contained on said support layer. The ceramic material is present in, or

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on the support layer and further comprises metal material particles selected from groups III to VII of the periodic system (col. 2; col. 4, lines 24-59). The support layer may comprise polymeric fibers or metal wires (col. 3, lines 61-67) and be woven (col. 3, lines 38-60). The ceramic material is applied to the support layer through the application of metal particles in a suspension of at least one metallic oxide sol, at least one metalloid oxide sol or a mixture of these sols. The sols are obtained by hydrolyzing at least one compound, preferably at least one metallic compound, at least one metalloid compound or at least one composition metallic compound with alcohol and/or an acid (col. 5, lines 54-67). One preferable material to be hydrolyzed is a metal or metalloid alcoholate of Si (col. 6, lines 1-8). The hydrolyzing of Si provides a matrix consisting of a silicon network linked together by the Si-O-Si bridges. The sol may further comprise particles of the oxides of Al, Zr, Si, Ti, Ce or Fe ranging in size from 1 nm to 10 microns (col. 6, lines 1-43). This ceramic material serves as the claimed ceramic interlayer.

b. The hydrolyzing process used to form the ceramic material layer may be repeated to form a second ceramic layer upon the first ceramic layer (col. 7, lines 35-45). This second ceramic layer serves as the claimed ceramic coating. The ceramic coating may further comprise an organic bonding agent that provides the silicon network with organic radicals to be bound to silicon (examples 8 and 9). The particles added to the ceramic layer may be metallic or ceramic (col. 4, lines 24-67), including oxides of Al, Zr, Si, Ti, Ce or Fe ranging in size from 1 to 250 nm. The first ceramic matrix formed from the sol serves as the claimed at least one inorganic adhesive of the ceramic interlayer and bonds the particles to each other as well as the support layer. The thickness of the entire

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composite article is preferably as thin as 5 microns, requiring the ceramic coating to be thinner than 100 microns (col. 6, lines 54-65). It is reasonable to conclude that the ceramic coating layer of Penth et al. is transparent to electromagnetic radiation having a wavelength in the region of visible light, because the article of Penth et al. anticipates the claimed ceramic coating's composition, structure and thickness. These three attributes determine the transparency of said ceramic coating.

c. Claim 8 is rejected as particles of hydrophobicized silica from Degussa are suspended in the sol (examples 1 and 2). Claim 13 is rejected as the ceramic interlayer may comprise particles of the claimed oxide composition (col. 4, lines 44-55) at a size ranging from 260 nm to 10 microns (col. 4, lines 60-62) and said particles may be surrounded by a silicon network (col. 6, lines 1-7). The hydrolyzing of Si provides a matrix consisting of a silicon network linked together by the Si-O-Si bridges and oxygen atoms to attach the oxide particles to said silicon network. The organic radicals of the uppermost layer, the second ceramic layer, allow for the bonding of the silicon network of the interlayer to said second ceramic layer in connecting the network to additional silicon via carbon atoms. Claim 14 is rejected as  $\text{TiO}_2$  is a pigment and may be added to the ceramic interlayer (col. 4, lines 48-50). Claim 15 is rejected in that the composite created by coating with ceramic material can be wound on or off of a roll (col. 2, lines 55-60). Penth et al. fail to provide for the organic component having a hydroxyl group and an amine group.

d. Armbrust et al. disclose a sol-gel coating material comprising a sol produced by hydrolysis, condensation and complexing of at least one hydrolysable metal compound,

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two-bond organic radical, and a hydrolysable silane (abstract). Examples of hydrolyzable silanes include methyltriethoxysilane, glycidyloxypropyltriethoxysilane (GLYEO) or 3-aminopropyltriethoxysilane (AMEO) (col. 11, lines 5-28). The hydrolysis and condensation may be carried out in the presence of nanoparticles of  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$  and/or  $\text{TiO}_2$  (col. 11, lines 57-61). It is preferred to use at least two hydrolyzable silanes to produce the resultant sol, in particular 3-aminopropyltriethoxysilane (AMEO) and glycidyloxypropyltriethoxysilane (GLYEO) (col. 15, lines 55-59; col. 13, line 65-col. 14, line 17). The sols of the applied invention are used to form sol-gel coatings on any of a variety of substrates (col. 17, lines 28-46).

e. It would have been obvious to one of ordinary skill in the art to have replaced the organosilanes in both coating layers of Penth et al. with the composition of Armbrust et al. comprising AMEO and GLYEO with the motivation of using a coating that has improved adhesion characteristics as set forth in Armbrust et al. (col. 2, lines 29-42). The use of AMEO and GLYEO to form the silicon network would result in the claimed covalently bonded structure as this is the same process used by Applicant to arrive at the claimed structure.

***Response to Arguments***

3. Applicant's arguments filed 9/1/2010 have been fully considered but they are not persuasive.

4. Applicant argues that the compositions of Penth et al. and Armbrust et al. are substantially different in that the Penth et al. reference is directed to inorganic compounds and the Armbrust et al. reference describes compositions that include a copolymer. Examiner disagrees that the Penth et al. and Armbrust et al. inventions are substantially different in that both compositions contain organic bonding agents in the sol that provide organic radicals to be bound to silicon and the final coating formed is designed to be a transparent layer protecting the underlying substrate.

5. Applicant argues that there is no basis for modifying the inorganic compositions of Penth et al. in the manner of Armbrust et al., because Penth et al. is free of the organic components described in Armbrust et al. Both compositions contain organic bonding agents in the sol that provide organic radicals to be bound to silicon, and the final coating formed is designed to be a transparent layer protecting the underlying substrate. It would have been obvious to one of ordinary skill in the art to have replaced the organosilanes in both coating layers of Penth et al. with the composition of Armbrust et al. comprising AMEO and GLYEO with the motivation of using a coating that has improved adhesion characteristics as set forth in Armbrust et al. (col. 2, lines 29-42).

6. Applicant argues that the Armbrust compositions are excluded from the present claims which recite a ceramic coating layer that consists of a silicon network linked together by Si-O-Si bridges. This argument is unpersuasive as the compositions of Armbrust (AMEO and GLYEO)

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are used in the same manner as those used by Applicant, reacting the silanes. This would necessarily cause the formation of a Si-O-Si bridge system, where the hydroxyl group and amine group are covalently bonded to the Si atoms.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.



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Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D. MATZEK whose telephone number is (571)272-2423. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571.272.1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew D Matzek/  
Examiner, Art Unit 1786

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit  
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